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So You Want to Quit Smoking:

Have You Tried a Mobile Phone?

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Abstract

Tobacco use, which is rising quickly in developing countries, kills 5.4 million people a year worldwide. This paper explores the impacts of mobile phone ownership on tobacco consumption. Indeed, mobile phone ownership could affect tobacco consumption because individuals might pay for their communication with money they would have spent on tobacco. Using panel data from 2,100 households in 135 communities of the Philippines collected in 2003 and 2006, the analysis finds that mobile phone ownership leads to a 20 percent decline in monthly tobacco consumption. Among households in which at least one member smoked in 2003, purchasing a mobile phone leads to a 32.6 percent decrease in tobacco consumption per adult over the age of 15. This is equivalent to one less pack of 20 cigarettes per month per adult. The results are robust to various estimation strategies. Further, they suggest that this impact materializes through a budget shift from tobacco to communication.

This paper—a product of the Social Development Department, Sustainable Development Network—is part of a larger effort in the department to analyze how increased information flow affect household welfare. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at jlabonne@worldbank.org and rchase@worldbank.org.

So You Want to Quit Smoking: Have You Tried a Mobile Phone? [1]

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1. Introduction

Tobacco use kills 5.4 million people a year.[3] This is likely to increase over the next decades as tobacco consumption grows in developing countries. In addition to health impacts, smoking diverts poor households' resources away from other more productive use. For example, Banerjee and Duflo (2007) report that in Mexico, the extremely poor in rural areas spend about 8.1 percent of their budget on tobacco and alcohol.

The literature on the determinants of smoking behavior points to a clear link between price increases and a reduction in the number of cigarettes smoked. Increasing taxes on tobacco has therefore often been advocated as a means to reduce smoking. However, recent evidence casts some doubts on the health impacts of tobacco taxes. Indeed, Adda and Cornaglia (2006) show that price increases lead smokers to smoke more intensively (*i.e.*, extract more nicotine per cigarette) which is detrimental to health.

Recently, some in the public health community have suggested that, in developed countries, mobile phone usage could play a role in reducing smoking, especially among cash constrained teenagers (Charlton and Bates, 2000). Analyses undertaken in European countries appear to contradict this claim, however (Steggles and Jarvis, 2003). No analysis has been carried out in a developing country context where mobile phones are spreading rapidly, even though the potential impact of such phones on tobacco consumption is the greatest because of stricter household budget constraints.

The paper uses household panel data to examine the impact of mobile phone ownership on tobacco consumption. Our results point to a large and robust negative impact of mobile phone ownership on tobacco consumption. Among households in which at least one member smoked in 2003, purchasing a mobile phone leads to a 32.6 percent decrease in tobacco consumption per adult over the age of 15. This is equivalent to one less pack of 20 cigarettes per month. In addition to simple OLS difference-in-differences estimates

[3] http://www.who.int/tobacco/mpower/tobacco_facts/en/index.html Accessed 5/17/2008

we also report matched difference-in-differences estimates. Both methods yield similar results. Further, our results suggest that this impact materializes through a budget shift from tobacco to communication.

The paper is organized as follows. The data and basic descriptive statistics are described in Section 2. The estimation strategy is presented in Section 3. Results are discussed in Section 4. The final section concludes.

2. The Data

Our analysis relies on household panel data collected in 135 villages of the Philippines. The first round of data collection took place in the fall of 2003 and the sample included 2,400 households of which 2,092 were re-interviewed in the fall of 2006. The dataset contains detailed information on consumption patterns, mobile phone ownership, household structure, education achievements as well as asset and land ownership (Chase and Holmemo, 2005). Because consumption information was collected item by item, we can extract tobacco and communication consumption (*i.e.*, all phone-related expenses) from total consumption.

Over the survey period, mobile phone ownership spread quickly in the sampled communities. Indeed, while the proportion of households owning a mobile phone in 2003 was 8.4 percent, it rose to 35.4 percent in 2006.

Smoking is prevalent in our sample with 41.6 percent of households reporting some tobacco consumption in 2003. The average monthly tobacco consumption was about 31.2 Philippine Peso (PHP) per adult over the age of 15. This is equivalent to 1.24 packs of 20 sticks.[4] This rose to 75.9 PHP for households in which at least one member smoked in 2003. Overall, tobacco consumption represented 2.01 percent of their total budget.

[4] According to WHO (2008), the price of a pack of 20 sticks for the most popular brand in the Philippines is 25 PHP.

Results from t-tests and Kolmogorov-Smirnov tests (Table 1) indicate that there is no difference in the 2003 distribution of tobacco consumption between the households who purchased a mobile phone between 2003 and 2006 and those who did not.

Over the period 2003-2006, the average monthly tobacco consumption decreased to 30.4 PHP per adult over the age of 15. A different picture emerges once we separate households who owned and who did not own a mobile phone in 2006. Indeed, for households without a mobile phone, monthly tobacco consumption rose to 33.9 PHP while it decreased to 23.1 PHP for households who such a phone (cf. Figure 1).

3. Estimation Strategy

3.1. Basic Setup

Let $Ln(C_{ijt})$ be household *i*'s (log) per adult (over 15) tobacco consumption.[5] It is determined by:

$$Ln(C_{ijt}) = \alpha * M_{ijt} + \beta * X_{ijt} + u_{ij} + v_{jt} + w_{ijt} \quad (1)$$

where α and β are coefficients to be estimated, M_{ijt} is a dummy equal to one if household *i* in village *j* owns a mobile phone at time *t*, X_{ijt} is a vector of control variables that vary across households and time, u_{ij} is a time-constant household effect, v_{jt} is an effect common across all households in village *j* at time *t* and, w_{ijt} is the usual idiosyncratic error term.

We can eliminate u_{ij} by differencing equation (1). Rewriting $v_j^{'} = (v_{j1} - v_{j0})$ and $w_{ij}^{'} = (w_{ij1} - w_{ij0})$ leads to:

[5] The main results of the paper are basically unchanged if we run our regressions with a different age cut-off. Results available upon request.

$$\Delta Ln(C_{ij}) = \alpha * \Delta M_{ij} + \beta * \Delta X_{ij} + v_j^{'} + w_{ij}^{'} \quad (2)$$

We will estimate equation (2) through OLS, include village dummies and compute standard-errors robust to arbitrary variance structure within villages. Further, as smokers are predominantly men in the Philippines (WHO, 2008), we will also run (2) with a measure of tobacco consumption per male household member over the age of 15 (in effect assuming that only males in the household smoke).

The vector X_{ijt} of control variables includes an index of household wealth, the number of household members working in the farm sector, the number of household members working in the non-farm sector, the total number of household members, number of household members above sixty, number of household members under five, household head age, maximum years of education in the household, household head's spouse age as well as a dummy indicating if the household owns land for purposes other than residence. In addition, we also include in equation (2) a dummy equal to one if a household member migrated over the period, a dummy equal to one if a household member died over the period and a dummy equal to one if a household member suffered a serious illness over the period.

A small proportion of households (8.4 percent) owned a mobile phone in 2003. Comparing those households with households who did not own a mobile phone in 2003 along the baseline covariates indicate that the differences between the two groups were large and significant. Thus, while we will present results obtained with the full sample, we will focus our analysis on households who did not own a mobile phone in 2003.

3.2. Dealing with Selection on Observables

There are some differences along baseline covariates between households who purchased a mobile phone between 2003 and 2006 and those who did not. This might lead to biased estimates. It is possible to remove such bias by estimating equation (2) through Weighted Least Squares (WLS) using specific weights (Hirano et al. 2003). Those weights are

computed as follows: $\lambda_{ij} = \frac{M_{ij1}}{\tilde{p}(X_{ij0})} + \frac{1-M_{ij1}}{1-\tilde{p}(X_{ij0})}$ with $\tilde{p}(X_{ij0})$ being a parametric estimate of the propensity score: $P(M_{ij1}=1 \mid X_{ij0})$.[6] This leads to efficient and consistent estimates of α as long as either the propensity score or the regression model are specified correctly (Imbens and Wooldridge, 2007).

The validity of our WLS estimates relies on the Conditional Independence Assumption: conditional on the covariates, owning a mobile is exogenous (*i.e.*, not driven by unobservables that also affect the decision to smoke). While we cannot directly test this assumption we can assess if it is plausible by regressing $Ln(C_{ij0})$ on M_{ij1}. The closer the estimated coefficient is to zero, the greater the plausibility that the assumption holds (Imbens and Wooldridge, 2007). Results are available in Table A1. None of the coefficients are statistically different from zero at the usual levels and none of the t-statistics are greater than 0.67. Our results are thus unlikely to be driven by selection on unobservables.[7]

4. Results

In this section, we first empirically assess the impact of mobile phone ownership on smoking behavior by implementing the estimation strategy discussed in Section 3.

[6] Estimates are available in Table A2.

[7] While the results indicate that selection on unobservables is not very likely, as a further test of robustness, we also estimate equation (2) through IV. The validity of such estimates relies on the availability of an instrument that explains the decision to buy a mobile phone but is not correlated with the decision to smoke (other than through the impact of mobile phone). We use the 2003 asset index as an instrument for mobile phone purchase. Results available in Table A2 indicate that this is a good predictor of the decision to buy a phone between 2003 and 2006 (t-stat is equal to 10.8). Further, a regression of the 2003 level of tobacco consumption on the 2003 asset index does not yield any significant results (t-stat is equal to -0.51). (Results available upon request). While not a direct test of the validity of our instruments, this suggests that our asset index is not directly correlated with the decision to smoke. We use the Limited Information Maximum Likelihood (LIML) estimator as it performs better than 2SLS in finite samples. We test whether our instrument set is weak against the alternative hypothesis that it is strong using the test put forward in Stock and Yogo (2005). In all regressions we can reject the null hypothesis that our instruments are weak. All our IV results are consistent with both our OLS and WLS results.

Results are available in Table 2. We then discuss potential channels through which this effect could materialize.

4.1. Basic Results

Mobile phone ownership leads to a sharp decrease in tobacco consumption. Specifically, our estimates indicate that mobile phone ownership leads to a 9.5 percent decline in tobacco consumption. This effect rises to 18.2 percent once we exclude households that owned a mobile phone in 2003.

Our results might capture a reduction in the decision to start smoking rather than a decrease of tobacco consumption among those who smoked. We also estimate equation (2) but exclude all households that did not report any tobacco consumption in 2003. Results are available in Columns 3 and 6-7 of Table 2. Our estimates are larger than with our broader sample. In this subsample, mobile phone ownership is associated with a 32.6 percent drop in tobacco consumption. This is equivalent to about one pack of 20 cigarettes a month per adult over the age of 15 in the household. Mobile phone ownership does lead to a drop in tobacco consumption among those who smoked in 2003.

Our measure of tobacco consumption is not individual-specific, and thus household-level changes could be driven by changes in household composition. For example, if the household head was the only smoker in the household and died during the period, tobacco consumption should go down regardless of mobile phone ownership status. If households with and without mobile phones were affected differently by migration and death that could bias our estimates. As a result, we run equation (2) but restrict our sample to those households in which the set of household members over the age of 15 did not change over the three-year period. Available in Panel C and D of Table 2, results are consistent with the ones obtained previously: mobile phone ownership leads to a drop in tobacco consumption.

A potential concern with our results is that the observed drop could be explained by a drop in price rather than a decrease in the number of cigarettes smoked. Indeed, tobacco sellers could decrease their prices in response to the introduction of mobile phones in their community. However, changes in tobacco prices are unlikely to explain our results as we control for time-varying village effects and prices are likely to be the same for all households in a given village.

Further, households might shift to less expensive brands. To deal with those concerns, we assess the links between mobile phone ownership and the decision to quit smoking. Indeed, if the impact of mobile phones was merely capturing a shift to less expensive brands, we should not observe any impact on the decision to quit smoking. We run Probit regressions of the decision to quit smoking on the mobile phone dummy and a set of covariates (measured as 2003-2006 changes). We include village dummies and compute standard errors robust to arbitrary covariance structure within villages. Households for which tobacco consumption was greater than zero in 2003 but was equal to zero in 2006 are classified as having quitted smoking. Results are available in Table 3. Households who purchased a mobile phone between 2003 and 2006 are 20.4 percentage points more likely to have stopped smoking. This result holds if we restrict our sample to households in which the set of household members over the age of 15 did not change over the three-year period (Panel B in Table 4). This indicates that shifts to less expensive brands cannot fully explain our results.

4.2 Alternative Explanations and Potential Channels

Our results could also capture the links between wealth, mobile phone ownership and tobacco use. Indeed, if as they get richer, households buy a mobile phone and reduce their tobacco consumption, we would be merely capturing a wealth effect rather than the actual impact of mobile phone ownership. We assess if tobacco consumption is explained by (non tobacco) consumption. We run equation (2) but include the change in total (non tobacco) per capita consumption as a dependent variable. Results are available in Panel A of Table 4. Our results are consistent with the ones obtained above: even after controlling

for household-fixed effects, tobacco consumption goes up with overall (non-tobacco) consumption. It is important to note that the mobile phone dummy is still significant. Overall, the results discussed above indicate that 'wealth effects' are not driving our results.

We now assess if the impact of mobile phone is specific to tobacco consumption. Indeed, it is possible that mobile phone-related expenses negatively affect not only tobacco consumption but also the consumption of all other goods consumed by households. We test if mobile phone ownership has any impact on alcohol consumption (per adult over 15) and per capita food consumption. Results are available in Panel B and C of Table 4. We find that mobile phone ownership does not negatively impact on alcohol and food consumption. There is something special about the relationship between mobile phones and tobacco consumption.

Having shown that mobile phone ownership leads to a sharp decline in tobacco consumption, we now turn our attention to the channels through which this effect might materialize.

Households might need to reduce tobacco consumption to pay for their communication (i.e., there is a cross-price elasticity between tobacco and communication). We assess if changes in tobacco consumption can be explained by change in 'communication consumption' (*i.e.*, all phone-related expenses). We start by plotting 'communication consumption' in 2003 and 2006 for households by mobile phone ownership status. Communication consumption increased by 34.2 PHP (per adult over 15) in households who purchased a mobile phone between 2003 and 2006 while it only increased by 3.27 PHP for households who did not (cf. Figure 2).

We also run equation (2) but substitute the mobile phone dummy by the change in the 'communication consumption.' Results are available in Panel D of Table 4. There is a negative and significant relationship between communication and tobacco consumption. This indicates that the impact of mobile phone on tobacco consumption is driven by a

shift of resources from tobacco to communication. This shift might be explained by the role of tobacco consumption and mobile phone use as a signal for social status. It is possible that while tobacco consumption used to be a signal for social status, it it now slowly being replaced by mobile phone ownership and use.

5. Conclusion

In this paper, we explore the impact of mobile phone ownership on tobacco consumption. Using household panel data, we find that purchasing a mobile phone leads to a sharp decline in tobacco consumption. This effect is large and materializes through a budget shift from tobacco to communication.

An interesting avenue for further analysis is to understand the role of social status in explaining the observed shift between tobacco and communication. Indeed, it might be that smoking used to be a signal for social status and this signal is slowly being replaced by mobile phone ownership and use.

Finally, it appears important to assess if those results hold in other countries. First, in countries at similar levels of incomes, other goods might get crowded out by mobile phones. Second, in richer countries, the budget constraints might not be as strong and thus mobile phone ownership might not lead to such a crowding-out.

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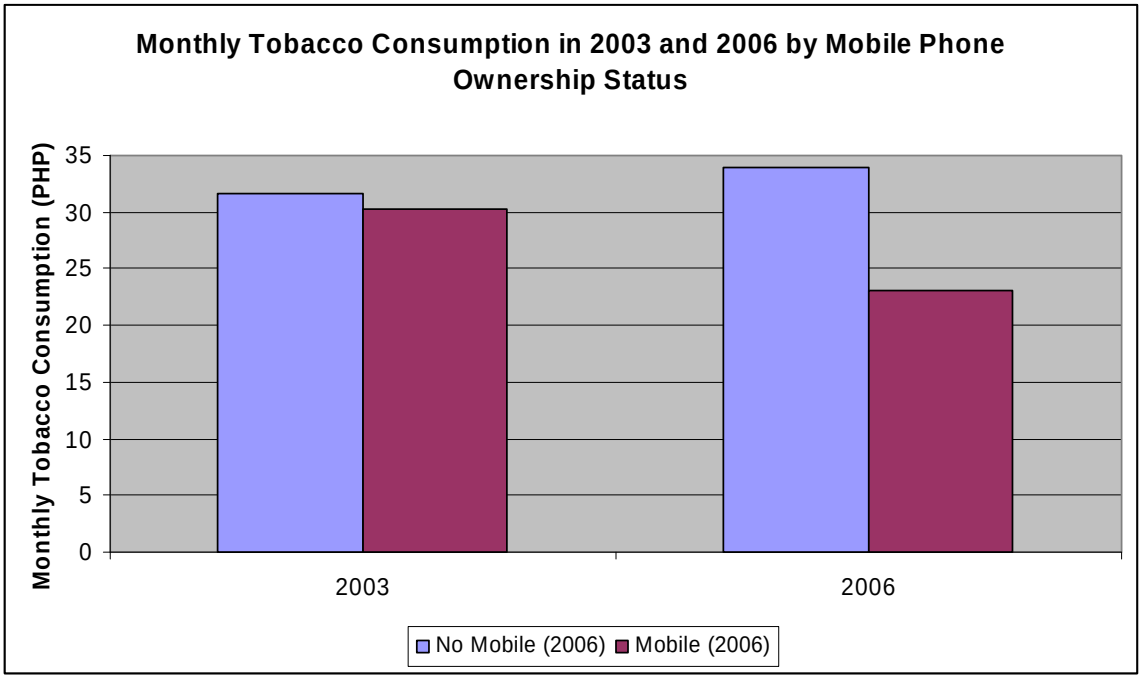
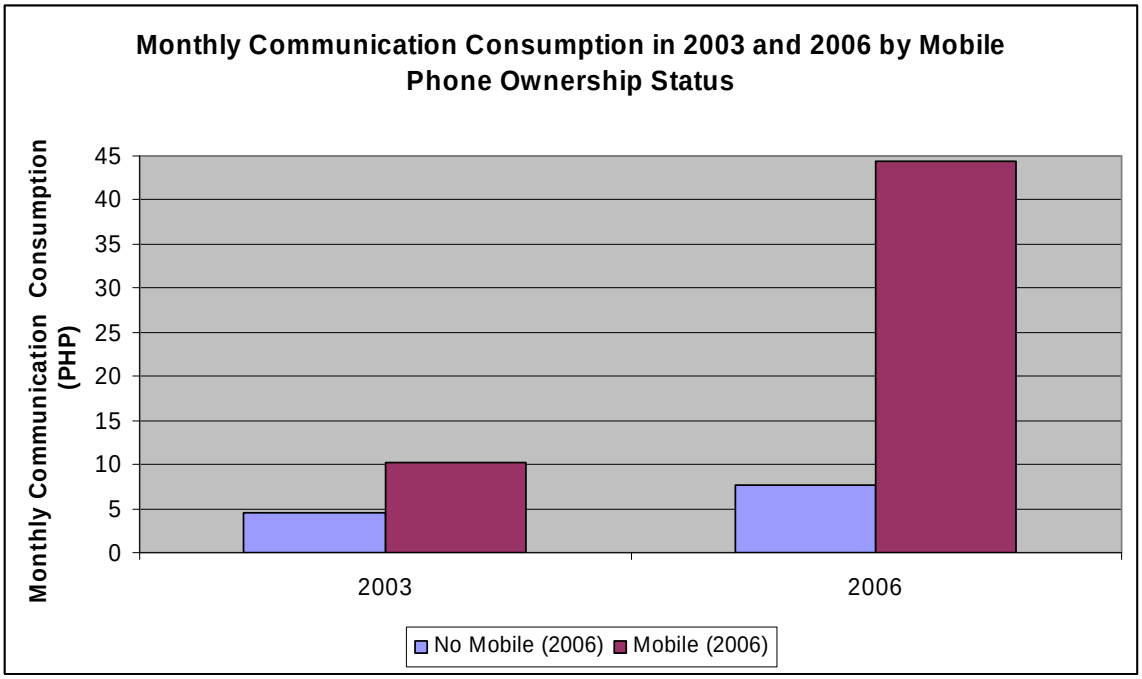
Figures


Monthly Tobacco Consumption in 2003 and 2006 by Mobile Phone Ownership Status
Monthly Tobacco Consumption (PHP)
35
30
25
20
15
10
5
0
2003
2006
No Mobile (2006)
Mobile (2006)


Monthly Communication Consumption in 2003 and 2006 by Mobile Phone Ownership Status
Monthly Communication Consumption (PHP)
45
40
35
30
25
20
15
10
5
0
2003
2006
No Mobile (2006)
Mobile (2006)

Tables

Table 1 - Comparing Households with and without Mobile Phones in 2006

	Mean		T-test	Kolmogorov
	Mobile Phone	No Mobile Phone	Equality Means	Equality distribution
	(1)	(2)	(3)	(4)
Monthly Tobacco Consumption	30.28	31.66	0.496	0.034
(2003) adult over 15	(2.31)	(1.57)	[0.620]	[0.987]
Monthly Tobacco Consumption	62.28	61.88	-0.066	0.066
(2003) per male over 15	(5.02)	(3.36)	[0.946]	[0.437]

Note: The standard deviations are in parentheses (Column 1 – 2) and the p-value are in brackets (Column 3 - 4). We exclude all households who owned a mobile phone in 2003.

Table 2 - Access to Mobile Phones and Tobacco Consumption

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) WLS	(6) OLS	(7) WLS
Panel A : (log) Tobacco Consumption (per adult over 15)							
D Mobile	**-0.095**	**-0.103**	**-0.172**				
	(0.056)*	**(0.058)***	**(0.095)***				
Mobile (2006)				**-0.182**	**-0.218**	**-0.326**	**-0.338**
				(0.061)***	**(0.070)*****	**(0.094)*****	**(0.103)*****
Obs.	2066	2063	861	1889	1821	778	750
R-squared	0.22	0.22	0.30	0.23	0.23	0.31	0.31
Panel B : (log) Tobacco Consumption (per male over 15)							
D Mobile	**-0.151**	**-0.151**	**-0.269**				
	(0.074)**	**(0.077)***	**(0.119)****				
Mobile (2006)				**-0.239**	**-0.281**	**-0.470**	**-0.482**
				(0.083)***	**(0.095)*****	**(0.120)*****	**(0.129)*****
Obs.	1905	1904	808	1746	1682	732	704
R-squared	0.23	0.23	0.32	0.24	0.24	0.33	0.34

Note: **Results from fixed-effects OLS and WLS regressions**. The dependent variable is the household-level change (2003-2006) in the consumption measured considered. Each cell is the coefficient on the variables ΔM_{ij} (Column 1—3), M_{ij1} (Columns 4-7) from a different regression. The standard errors (in parentheses) are Huber-corrected and account for intra-village correlation. * denotes significance at the 10%, ** at the 5% and, *** at the 1% level.

Control Variables: All regressions include village dummies. In addition, in Column 2-7 we also include the 2003-2006 change in wealth, household size, household head (and spouse) age, number of household members above sixty, number of household members under five, maximum years of education, in a dummy indicating if the household owns land for purposes other than residence, a dummy equal to one if a household member migrated over the period, the change in the number of household members employed in the farm sector, the change in the number of household members employed in the non-farm sector, a dummy equal to one if a household member died over the period and, a dummy equal to one if a household member suffered a serious illness over the period.

Sample: Full sample (Column 1-2). We exclude all households for which tobacco consumption was zero in 2003 (Column 3 and 6-7). We exclude all households who owned a mobile phone in 2003 (Column 4-7).

Table 2 - Access to Mobile Phones and Tobacco Consumption (Continued)

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) WLS	(6) OLS	(7) WLS
Panel C : (log) Tobacco Consumption (per adult over 15) – Excluding households in which the set of household members over 15 changed over the 3-year period							
D Mobile	**-0.284**	**-0.287**	-0.236				
	(0.114)**	**(0.114)****	(0.206)				
Mobile (2006)				**-0.384**	**-0.416**	**-0.491**	**-0.494**
				(0.127)***	**(0.141)*****	**(0.253)***	**(0.288)***
Obs.	796	795	320	736	700	295	277
R-squared	0.32	0.34	0.47	0.34	0.36	0.49	0.52
Panel D : (log) Tobacco Consumption (per male over 15) – Excluding households in which the set of household members over 15 changed over the 3-year period							
D Mobile	**-0.401**	**-0.363**	-0.397				
	(0.146)***	**(0.151)****	(0.256)				
Mobile (2006)				**-0.483**	**-0.511**	**-0.751**	**-0.848**
				(0.174)***	**(0.195)*****	**(0.317)****	**(0.362)****
Obs.	748	748	307	691	657	283	265
R-squared	0.33	0.35	0.49	0.35	0.37	0.50	0.54

Note: **Results from fixed-effects OLS and WLS regressions**. The dependent variable is the household-level change (2003-2006) in the consumption measured considered. Each cell is the coefficient on the variables ΔM_{ij} (Column 1—3), M_{ij1} (Columns 4-7) from a different regression. The standard errors (in parentheses) are Huber-corrected and account for intra-village correlation. * denotes significance at the 10%, ** at the 5% and, *** at the 1% level.

Control Variables: All regressions include village dummies. In addition, in Column 2-7 we also include the 2003-2006 change in wealth, household size, household head (and spouse) age, number of household members above sixty, number of household members under five, maximum years of education, in a dummy indicating if the household owns land for purposes other than residence, a dummy equal to one if a household member migrated over the period, the change in the number of household members employed in the farm sector, the change in the number of household members employed in the non-farm sector, a dummy equal to one if a household member died over the period and, a dummy equal to one if a household member suffered a serious illness over the period.

Sample: Full sample (Column 1-2). We exclude all households for which tobacco consumption was zero in 2003 (Column 3 and 6-7). We exclude all households who owned a mobile phone in 2003 (Column 4-7).

Table 3 - Access to Mobile Phones and the Decision to Quit Smoking

	Probit (Marginal Effects)		
	(1)	(2)	(3)
Full Sample			
D Mobile	**0.128**	**0.135**	
	(0.039)* **	**(0.044)*** **	
Mobile (2006)			**0.204**
			(0.051)* **
Observations	867	866	786
Pseudo R-squared	.14	.16	.17
Excluding households in which the set of household members over 15 changed over the 3-year period			
D Mobile	**0.161**	**0.179**	
	(0.092)*	**(0.106)***	
Mobile (2006)			**0.284**
			(0.128) **
Observations	250	249	231
Pseudo R-squared	.14	.19	.19

Note: **Results from Probit regressions**. Each cell is the coefficient on the variables ΔM_{ij} (Column 1-2), M_{ij1} (Columns 3) from a different regression. The standard errors (in parentheses) are Huber-corrected and account for intra-village correlation. * denotes significance at the 10%, ** at the 5% and, *** at the 1% level.

Control Variables: All regressions include village dummies. In addition, in Column 2-3 we also include the 2003-2006 change in wealth, household size, household head (and spouse) age, number of household members above sixty, number of household members under five, maximum years of education, in a dummy indicating if the household owns land for purposes other than residence, a dummy equal to one if a household member migrated over the period, the change in the number of household members employed in the farm sector, the change in the number of household members employed in the non-farm sector, a dummy equal to one if a household member died over the period and, a dummy equal to one if a household member suffered a serious illness over the period.

Sample: We exclude all households for which tobacco consumption was zero in 2003 (Column 1-3). We exclude all households who owned a mobile phone in 2003 (Column 3).

Table 4 – Alternative Explanations and Potential Channels

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) WLS	(6) OLS	(7) WLS
Panel A : (log) Tobacco Consumption (per adult over 15)							
D Mobile	**-0.112**	**-0.112**	**-0.184**				
	(0.055)**	**(0.058)***	**(0.096)***				
Mobile (2006)				**-0.196**	**-0.244**	**-0.338**	**-0.357**
				(0.059)***	**(0.067)*****	**(0.093)*****	**(0.101)*****
D (log) p.c consumption	**0.232**	**0.266**	**0.169**	**0.296**	**0.303**	**0.221**	**0.213**
	(0.051)***	**(0.058)*****	**(0.089)***	**(0.061)*****	**(0.069)*****	**(0.092)****	**(0.095)****
Obs.	2066	2041	849	1867	1808	766	743
R-squared	0.23	0.24	0.30	0.25	0.25	0.32	0.32
Panel B : (log) Food Consumption (per capita)							
D Mobile	0.035	0.020					
	(0.027)	(0.024)					
Mobile (2006)				0.029	0.027		
				(0.029)	(0.034)		
Obs.	2067	2064		1890	1822		
R-squared	0.14	0.28		0.28	0.29		
Panel C : (log) Alcohol Consumption (per adult over 15)							
D Mobile	0.010	0.001	0.106				
	(0.050)	(0.059)	(0.146)				
Mobile (2006)				0.043	-0.007	0.294	0.292
				(0.054)	(0.057)	(0.149)*	(0.156)*
Obs.	2066	2063	422	1889	1821	363	353
R-squared	0.19	0.20	0.22	0.19	0.22	0.25	0.25
Panel D : (log) Tobacco Consumption (per adult over 15)							
D (log) comm. Cons.	**-0.026**	**-0.027**	**-0.037**	**-0.031**	**-0.033**	**-0.045**	**-0.042**
	(0.014)*	**(0.013)****	**(0.021)***	**(0.014)****	**(0.015)****	**(0.022)****	**(0.025)***
Obs.	2066	2041	849	1867	1808	766	743
R-squared	0.22	0.23	0.30	0.23	0.23	0.30	0.30

Note: **Results from fixed-effects OLS and WLS regressions**. The dependent variable is the household-level change (2003-2006) in the consumption measured considered. Each cell is the coefficient on the variables ΔM_{ij} (Column 1—3), M_{ij1} (Columns 4-7) from a different regression. The standard errors (in parentheses) are Huber-corrected and account for intra-village correlation. * denotes significance at the 10%, ** at the 5% and, *** at the 1% level.

Control Variables: All regressions include village dummies. In addition, in Column 2-7 we also include the 2003-2006 change in wealth, household size, household head (and spouse) age, number of household members above sixty, number of household members under five, maximum years of education, in a dummy indicating if the household owns land for purposes other than residence, a dummy equal to one if a household member migrated over the period, the change in the number of household members employed in the farm sector, the change in the number of household members employed in the non-farm sector, a dummy equal to one if a household member died over the period and, a dummy equal to one if a household member suffered a serious illness over the period.

Sample: Full sample (Column 1-2). We exclude all households for which tobacco consumption was zero in 2003 (Column 3 and 6-7). We exclude all households who owned a mobile phone in 2003 (Column 4-7)

Table A1 - Testing the Conditional Independence Assumption

Estimation Method	Coeff. (s.e.)
OLS – Full Sample	-0.024
	(0.054)
WLS – Full Sample	0.014
	(0.060)
OLS – Tobacco (2003) > 0	0.028
	(0.069)
WLS – Tobacco (2003) > 0	0.047
	(0.070)

Note: **Results from OLS and WLS regressions**. The dependent variable is the 2003 tobacco consumption per adult over 15 in the household. Each cell is the coefficient on the variable M_{ij1} from a different regression. We exclude all households for which tobacco consumption was zero in 2003. The standard errors (in parentheses) are Huber-corrected and account for intra-village correlation. * denotes significance at the 10%, ** at the 5% and, *** at the 1% level.

Table A2 – Propensity Score Estimates

	Probit (Marginal Effects)
	(1)
Asset (2003)	0.202
	(0.019)***
College (2003)	0.251
	(0.174)
Secondary (2003)	0.022
	(0.088)
No Education (2003)	-0.195
	(0.192)
Nb. Working Farm (2003)	0.012
	(0.037)
Nb. Working Non Farm (2003)	0.151
	(0.061)**
HH Size (2003)	0.059
	(0.024)**
Age head (2003)	0.004
	(0.005)
Nb. Above sixty (2003)	-0.098
	(0.101)
Nb. Under five (2003)	-0.157
	(0.052)***
Age spouse (2003)	0.001
	(0.002)
Land Owner (2003)	0.005
	(0.083)
Village Dummies	Yes
Observations	1824
Pseudo R-squared	0.15

Note: **Results from Probit regressions**. The dependent variable is a dummy equal to one if the household owns a cell phone in 2006. The standard errors (in parentheses) are Huber-corrected and account for intra-village correlation. * denotes significance at the 10%, ** at the 5% and, *** at the 1% level. We exclude all households who owned a mobile phone in 2003.